Pedagogic Course in Nature Study

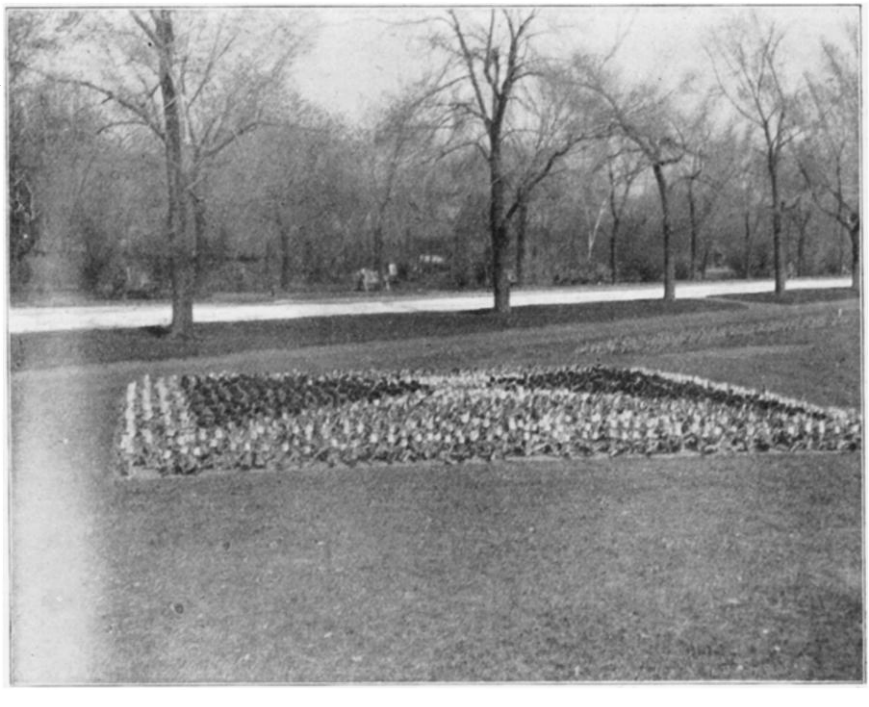
Charles W. Carman

LINCOLN PARK, MAY 11TH

Owing to the continued cold during the month of April and early part of May, the development of vegetation has been unusually retarded. In order to prepare the student to see as deeply as possible into the extensive work of changing a landscape from its winter condition to that of a fully developed vegetation, it has seemed necessary to make a microscopic study of plant development. Accordingly, laboratory work has alternated with observations and sketches in Lincoln Park.

A quantity of spirogyra was gathered. The long cells were worked out under the microscope and sketched. The starch formations were identified, sketched, and tested with iodine. The fibro-vascular systems were then studied by teasing out bundles taken from the corn-stalk and celery. Long, slender tubes, with strengthened walls, were clearly seen by magnifying three hundred diameters. A quantity of sap was then expressed from a number of young corn-stalks, and gently evaporated until crystals were formed. These were examined microscopically and then subjected to Fehling's test for sugar. Starch was then changed to sugar by adding to thin starch paste a quantity of barley ground in a mortar. After standing in a

LINCOLN PARK, MAY 15TH



LINCOLN PARK, MAY 18TH

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temperature of 80° to 90° for half an hour or less, Fehling's solution showed the presence of sugar. The reconversion of sugar into starch was shown by scraping bits from the potato and examining under the microscope. The grains were sketched and tested with iodine. The starch grains in wheat and corn were similarly examined and tested.

It is planned to follow the examination of the various structures of the plant, keeping constantly in mind the complete cycle of the plant's life. After completing some of the changes taking place in the leaf and stem, study was begun upon the roots. Cross sections were prepared and examined with the microscope. The seeds of the elm, maple, and box-elder were then collected, examined, and sketched.

Much of the time during the month of June will be spent in Lincoln Park *reading* into the vegetation the processes that were worked out in detail in the laboratory.

The theory continually held before the mind of the instructor, while developing the present course, may be formulated as follows:

1. The encouragement of accuracy in observation.

2. The cultivation of a desire to look beneath the surface of things in searching for truth.

3. The encouragement of a desire to collect a large number of accurate observations before attempting generalizations.